



# GULF ASIAN ENGLISH SCHOOL, SHARJAH

## Periodic Test 2 (2026-2027)

Subject: **MATHEMATICS (041)**

Grade: **X**

Max Marks: **80**

Date: **14/09/2026**

Time Allowed: **3 Hours**

### General Instructions:

1. This question paper contains **38** questions. All questions are **compulsory**.
2. This question paper is divided into **five** sections- **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1 to 18** are Multiple Choice Questions (MCQs) and question number **19 and 20** are Assertion –Reason based questions of 1 mark each.
4. In **Section B**, Questions no. **21 to 25** are Very Short Answer (VSA) type questions, carrying **2** marks each.
5. In **Section C**, Questions no: **26 to 31** are Short Answer (SA) type questions, carrying **3** marks each.
6. In **Section D**, Questions no. **32 to 35** are Long Answer (LA) type questions, carrying **5** marks each.
7. In **Section E**, Questions no. **36 to 38** are case study based questions carrying **4** marks each. Internal choice is provided in **2** marks questions in each case study.
8. There is no overall choice. However, an internal choice has been provided in **2** questions in Section B, **2** questions in Section C, **2** questions in Section D and **3** questions in section E.
9. Draw neat diagrams wherever required. Take  $\pi = \frac{22}{7}$  wherever required, if not stated.
10. Use of calculator is not allowed.

### Section A

This section comprises of Multiple-Choice Questions (MCQs) of 1 mark each.  $20 \times 1 = 20$

1. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $3x^2 + 14x - 5$ , then the value of  $3 \left( \frac{\alpha + \beta}{\alpha\beta} \right)$  is  
(a)  $\frac{14}{5}$  (b)  $\frac{42}{5}$  (c)  $\frac{-14}{5}$  (d)  $\frac{-42}{5}$
2. If HCF of two positive integers  $a$  and  $b$  is 1, then their LCM is  
(a)  $a+b$  (b)  $a$  (c)  $b$  (d)  $ab$
3.  $\frac{\sqrt{3} - 3}{\sqrt{3}}$  is  
(a) a rational number (b) an irrational number  
(c) an integer (d) a natural number

$$(\alpha + \beta)^2$$

4. The pair of linear equations  $x+2y-5=0$  and  $2x-4y+6=0$

- (a) is inconsistent  
(b) is consistent with many solutions  
(c) is consistent with a unique solution  
(d) is consistent with two solutions

(c)  $\sqrt{4x^2 - 9}$

5. The zeroes of the quadratic polynomial  $16x^2 - 9$  are

(a)  $\frac{3}{4}, \frac{3}{4}$

(b)  $\frac{9}{16}, \frac{9}{16}$

(c)  $-\frac{3}{4}, \frac{3}{4}$

(d)  $-\frac{3}{4}, -\frac{3}{4}$

6. If pair of linear equations given by  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$  has infinitely many solutions, then which of the following is definitely true?

(a)  $\frac{a_1}{a_2} = \frac{c_1}{c_2}$

(b)  $a_1a_2 \neq b_1b_2$

(c)  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(d)  $a_1b_2 = a_2b_1$

7. If HCF (850, 325) is 25, then LCM (850, 325) is :

(a) 442

(b) 11050

(c) 8450

(d) 2210

8.  $\frac{\sec^2 A - 1}{\sin^2 A}$  is same as

(a)  $\cos^2 A$

(b)  $\sec^2 A$

(c)  $-\sec^2 A$

(d)  $\cot^2 A$

9. If the quadratic equation  $9x^2 + 8kx + 16 = 0$  has real and equal roots, then the value of k is

(a) 3

(b) -3

(c) -4

(d)  $\pm 3$

10. If sum of first ten terms of an A.P. is zero with a as the first term and d, the common difference, which of the following relation is true?

(a)  $10a + 9d = 0$

(b)  $2a = 9d$

(c)  $a_{10} = -a$

(d)  $a_{10} = a$

11.  $3^n$ , where n is a natural number, cannot end with the digit :

(a) 3

(b) 5

(c) 7

(d) 9

12. The system of linear equations given by  $x = a$  and  $y = b$  is :

(a) Consistent with a unique solution.

(b) Consistent with infinitely many solutions.

(c) Consistent with two solutions.

(d) Inconsistent.

13. The value of p for which roots of the quadratic equation  $x^2 - px + 6 = 0$  are rational, is

(a) 1

(b) -5

(c) 25

(d)  $\sqrt{5}$

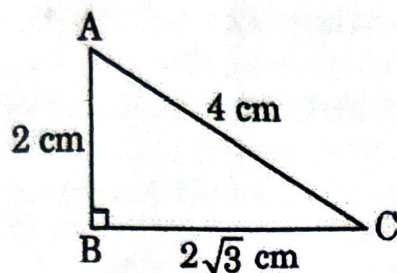
14. If sum and product of zeroes of a polynomial are  $(-3)$  and  $(-2)$  respectively, then a polynomial is

- (a)  $x^2 - 3x - 2$  (b)  $-x^2 - 3x + 2$  (c)  $-x^2 + 3x - 2$  (d)  $x^2 + 3x + 2$

15. In an A.P., if  $a_{14} - a_8 = 24$ , then the common difference of the A.P. is

- (a) 6 (b) 4 (c)  $\pm 4$  (d) 3

16. In the given figure, the angle of elevation of point A from point C is :



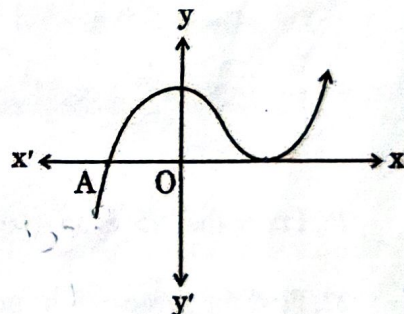
- (a)  $30^\circ$  (b)  $60^\circ$  (c)  $45^\circ$  (d) cannot be determined

17. If  $\sin \theta = \frac{a}{b}$  then  $\sec \theta$  is equal to ( $0 \leq \theta \leq 90^\circ$ ):

- (a)  $\frac{a}{\sqrt{b^2 - a^2}}$  (b)  $\frac{b}{\sqrt{b^2 - a^2}}$  (c)  $\frac{\sqrt{b^2 - a^2}}{a}$  (d)  $\frac{\sqrt{b^2 - a^2}}{b}$

18. The graph of  $y = f(x)$  is given. The number of distinct zeroes of  $y = f(x)$  is

- (a) 0 (b) 1 (c) 2 (d) 3



Question number 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion(A) and the other is labelled as Reason(R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

- (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).  
 (B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A).  
 (C) Assertion (A) is true but reason (R) is false.  
 (D) Assertion (A) is false but reason (R) is true.

19. Assertion (A) : The prime numbers which divide 36 also divide 6.  
 Reason (R) : Any number which divides  $p^2$  also divides  $p$ .

20. Assertion(A): For an acute angle  $\theta$ , if  $\cot \theta = 1$  then  $\operatorname{cosec} \theta = 2$ .

Reason (R) :  $\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$ .

### SECTION B

This section comprises of very short answer type-questions (VSA) of 2 marks each.  $5 \times 2 = 10$

21. Find the sum of the first 15 terms of the A.P. :  $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \dots$

22. Solve the following pair of linear equations :  $31x + 43y = 117$  ;  $43x + 31y = 105$

23. Two numbers are in the ratio 3 : 5 and their LCM is 180. Find the HCF of these two numbers.

24. Find the quadratic polynomial the sum of whose zeroes is 1 and their product is  $-12$ . Hence find the zeroes of the polynomial.

OR

If  $\alpha, \beta$  are zeroes of the polynomial  $x^2 - 6x + 7$ , then find the value of  $4 \left( \frac{1}{\alpha^2} + \frac{1}{\beta^2} \right)$ .

25. (a) If  $7 \sin^2 A + 3 \cos^2 A = 4$ , then find the value of  $\tan A$ .

OR

(b) If  $4 \tan A = 3$ , then find the value of  $\frac{\operatorname{cosec}^2 A + 1}{\operatorname{cosec}^2 A - 1}$

### SECTION C

This section comprises of short answer type questions (SA) of 3 marks each.  $6 \times 3 = 18$

26. Prove that  $\sqrt{5}$  is an irrational number.

27. Find the zeroes of the polynomial  $4x^2 + 3x - 1$  and verify the relationship between the zeroes and the coefficients of the given polynomial.

28. (a) Rehana went to a bank to withdraw ₹ 2,000. She asked the cashier to give her ₹ 50 and ₹ 100 notes only. Rehana got 25 notes in all. Find how many notes of ₹ 50 and ₹ 100 did she receive.

OR

(b) When 1 is subtracted from the numerator and 2 is added to the denominator of a fraction, it becomes  $\frac{1}{2}$ . When 7 is subtracted from the numerator and 2 is subtracted from the denominator, the fraction becomes  $\frac{1}{3}$ . Find the fraction.

29. (a) Find the values of A and B ( $0 \leq A < 90^\circ$ ,  $0 \leq B < 90^\circ$ ) if  $\tan(A+B) = 1$  and  $\tan(A-B) = \frac{1}{\sqrt{3}}$

OR

(b) Prove that  $\tan 45^\circ = 1$  geometrically.

30. Prove that :

$$(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$$

31. Find the discriminant of the equation  $3x^2 - 2x + \frac{1}{3} = 0$  and hence find the nature of its roots. Find them, if they are real.

### SECTION D

This section comprises of long answer-type questions (LA) of 5 marks each.  $4 \times 5 = 20$

32. Two poles of equal heights are standing opposite to each other on either side of the road which is 90 m wide. From a point between them on the road, the angles of elevation of the top of the poles are  $30^\circ$  and  $60^\circ$  respectively. Find the height of the poles and the distances of the point from the poles. [Use  $\sqrt{3} = 1.732$ ]

33. The sum of areas of two squares is  $2650 \text{ cm}^2$ . If the sum of their perimeters is 280 cm, find the sides of the two given squares.

OR

- (b) Express the equation  $\frac{1}{x} - \frac{1}{(x-2)} = 3$  ( $x \neq 0, 2$ ) as a quadratic equation in standard form. Hence, find the roots of the quadratic equation so obtained.

34. Aarush bought 2 pencils and 3 chocolates for ₹ 11 and Tanish bought 1 pencil and 2 chocolates for ₹ 7 from the same shop. Represt this situation in the form of a pair of linear equations in two variables. Find the price of 1 chocolate and 1 pencil graphically.

35. (a) The 17<sup>th</sup> term of an AP is 5 more than twice its 8<sup>th</sup> term. If the 11<sup>th</sup> term of the AP is 43, then find its  $n^{\text{th}}$  term.

OR

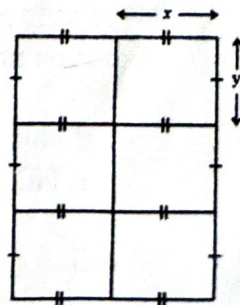
- (b) The 4<sup>th</sup> term of an AP is zero. Prove that the 25<sup>th</sup> term of the AP is three times its 11<sup>th</sup> term.

### SECTION E

This section comprises of 3 case study based questions of 4 marks each.  $3 \times 4 = 12$

#### Case Study-1

36. Observe the figure given below. It shows six identical rectangular enclosures made by using fencing wire mesh. These enclosures are used to protect baby animals in a zoo. Dimensions of each enclosure is  $x$  feet  $\times$   $y$  feet. The total length of fencing required is 152 feet and area of each enclosure is 80 square feet.



Based on the above, answer the following questions :

- (i) Write an expression for length of fencing required in terms of  $x$  and  $y$ .
- (ii) Write the area of each enclosure in terms of  $x$ .
- (iii) (a) Write the above equation in quadratic equation form and thus find the dimensions of each enclosure using factorisation method.

OR

- (b) Using above equation in quadratic form, solve the equation and find the dimensions of each enclosure using quadratic formula.

37. Kite festival is a popular festival in India which takes place during Makar Sankranti. The festival is celebrated by people flying kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. The height of Reena's kite is 60m above the ground level. The string attached to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is  $30^\circ$ . Ravi is flying a kite from a 10 m high building. His kite is also flying 60 m above the ground and is the length of the string used by Ravi is same as that of Reena's.  $\theta$  is the angle of elevation of Ravi's kite from a point on the rooftop.

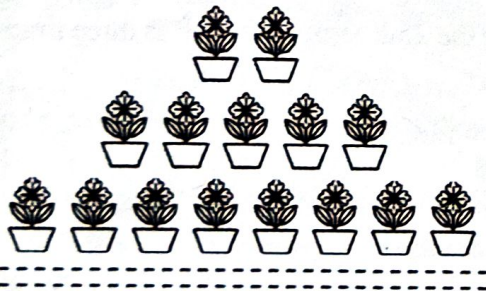
Based on the above information, answer the following questions :

- (i) Find the length of string used by Reena.
- (ii) Find the value of  $\sin \theta$
- (iii)(a) If  $\theta$  changes to  $60^\circ$ , without changing the length of the string what will be the height of Ravi's kite above the ground? (Use  $\sqrt{3} = 1.7$ )

OR

- (b) What would have been the height of Ravi's kite above the ground, if the string had an inclination of  $30^\circ$  with the ground, assuming that the length of the string does not change?

38. Ahana being a plant lover decided to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed pots in such a way that the number of pots in the first row is 2, second row is 5, third row is 8 and so on.



Based on the information answer the following questions.

- i) Find the number of pots placed in the 10<sup>th</sup> row.
- (ii) Find the difference in the number of pots placed in the 5<sup>th</sup> row and 2<sup>nd</sup> row.
- (iii) (a) If Ahana wants to place 100 pots in total, then find the total number of rows formed in the arrangement.

OR

- (b) If Ahana has sufficient space for 12 rows, then how many total number of pots are placed by her with the same arrangement?